



## Original article

# Serious Psychological Distress as a Barrier to Cancer Screening Among Women

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## ABSTRACT

**Background:** The purposes of the study were to examine the association of serious psychological distress (SPD) and cancer-screening utilization in a nationally representative sample of women aged 40 to 74 years and to identify barriers and facilitating factors to breast and cervical cancer screening among women with SPD.

**Methods:** Women aged 40 to 74 ( $n = 17,770$ ) were selected from the Household Component of Medical Expenditure Panel Survey series of 2007, 2009, and 2011. SPD was defined as a score of 13 or higher on the Kessler Psychological Distress Scale–6 items (K6 scale) of nonspecific psychological distress. Logistic regression was conducted to examine the association between SPD and up-to-date cancer screening.

**Findings:** Women with SPD had significantly lower rates of up-to-date clinical breast examination (67.56% vs. 81.93%), mammography (59.94% vs. 75.56%), and Pap smear (72.27% vs. 85.37%). In multivariate logistic regression analyses adjusting for sociodemographics, insurance, health behaviors, comorbidity, and service utilization, SPD was associated with nearly 40% decreased odds of being up to date with all three screening tests. Having a usual place of care, being physically active, and a greater number of past-year medical visits were strongly associated with higher odds of screening utilization among women with SPD.

**Conclusions:** Women with mental health problems have substantial risk for low use of routine breast and cervical cancer screenings. The K6 may be a useful tool to screen this risk factor. Frequent contact with the health care system among women with mental health problems opens up opportunities to reduce the mental illness-related disparities in utilization of cancer screening.

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Breast and cervical cancer are significant causes of mortality, with estimated deaths of 45,000 in the United States in 2010 (U.S. Cancer Statistics Working Group, 2013). Periodic screening reduces mortality from these cancers and is widely recommended in well-regarded guidelines (American College of Obstetricians and Gynecologists [ACOG], 2009; U.S. Preventive Services Task Force [USPSTF], 2009). Despite a substantial increase in screening rates in the United States in the past decade, significant disparities in screening and disease burden in medically underserved groups and communities persist (Lasser et al., 2003). A less

discussed disparity in cancer screening is among women with mental illness, such as depression, anxiety, schizophrenia, and bipolar disorder. Although the term health disparities is often interpreted in the context of race and ethnicity, many systematic social or economic obstacles to health exist in the United States (Carter-Pokras & Baquet, 2002). *Healthy People 2020* has extended the definition of health disparities and specifically listed mental health as a characteristic historically linked to discrimination or exclusion (U.S. Department of Health and Human Services, 2008). Persons with mental illness are at elevated risk for physical comorbidities and premature mortality and experience significant barriers in accessing health services (Colton & Manderscheid, 2006; Druss, 2007). There is a growing concern that inadequate utilization of medical services is partially responsible for the disparities in disease-specific morbidity and mortality among persons with mental illness (Druss, 2007).

However, studies examining the role of mental illness in cancer screening utilization among women have produced inconsistent results. In a recent systematic review, Aggarwal,

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Pandurangi, and Smith (2013) identified 15 studies that examined breast and cervical cancer screening among women with mental illness. About one half of these studies found that mental illness was associated with lower rates of cancer screening, with some inconsistencies by types of screening tests. In one study, women with high depressive symptom burden had significantly lower odds of mammography but not Pap smear in the subsequent year (Pirraglia, Sanyal, Singer, & Ferris, 2004). In comparison, lower rates of cervical cancer screening among women with schizophrenia and psychosis were reported in two studies (Martens et al., 2009; Tilbrook, Polsky, & Lofters, 2010). The other half of the studies found no difference in cancer screening utilization between women with or without mental illness. Varying sample size, study settings, and the definition and assessment of mental illness are possible explanations of the mixed findings (Aggarwal et al., 2013; Yee et al., 2011).

The limitations of previous studies, including small sample size and samples recruited from unique settings (e.g., psychiatric inpatient or outpatient), limit their ability to generalize the findings to broader populations. Small sample size also reduces statistical power, which may prevent studies from identifying small to moderate effect sizes. Moreover, most studies grouped patients by only psychiatric diagnosis, which is prone to misclassification error (Aggarwal et al., 2013). This grouping methodology also makes it difficult to capture the severity of illness within the same diagnostic criteria. Additionally, using samples with psychiatric diagnosis systematically excludes persons with undiagnosed, underdiagnosed, or untreated mental illness, estimated to be more than one half of all persons with severe mental illness (Kessler et al., 2001).

To address these limitations, this study used a global indicator of mental health that is more reliable and applies more broadly to a representative population of women. The primary objective of this study was to examine the role of serious psychological distress (SPD) in cancer screening utilization, including clinical breast examination (CBE), mammography, and Pap smear, in a nationally representative sample. SPD as measured by the Kessler Psychological Distress Scale–6 items (K6 scale) of nonspecific psychological distress (Kessler et al., 2002), is a nonspecific indicator of past-year mental health problems such as anxiety or mood disorders (Substance Abuse and Mental Health Services Administration [SAMHSA], 2008). The K6 was developed to identify persons in the general population with a high likelihood of having a diagnosable mental illness and associated functional limitations by using as few questions as possible (Kessler et al., 2002; Pratt, Dey, & Cohen, 2007). It has been implemented into major national surveys and surveillance systems to identify needs for programs and resources (Croft, Mokdad, Power, Greenlund, & Giles, 2009). By examining the association of SPD and cancer screening utilization, this study aimed at exploring the utility of K6 as an alternative to psychiatric diagnosis in assessing risks for underutilization of cancer screening among women. The secondary objective of the study was to identify barriers and facilitating factors to cancer screening among women with SPD.

## Material and Methods

### Participants

This study analyzed data from the Household Component of Medical Expenditure Panel Survey (MEPS-HC), a large-scale, nationally representative survey of health services and

expenditures for the U.S. resident civilian noninstitutionalized population sponsored by the Agency for Healthcare Research and Quality (AHRQ) and the Centers for Disease Control and Prevention (CDC). The panel design of the survey features five rounds of interviewing covering two consecutive calendar years for each panel. Since 2000, MEPS also administers Adult Self-Administered Questionnaire, a mail-back paper survey including questions regarding physical and mental health symptoms, smoking, and other attitude items to all household respondents aged 18 or older to supplement the data collected by interviews. The MEPS is designed in a way that data for each calendar year, covering rounds 3, 4, and 5 of the panel in its second year and rounds 1, 2, and 3 of the panel in its first year, is representative of the U.S. population in that year. This study did a cross-sectional analysis of full-year MEPS-HC data files from 2007, 2009, and 2011 (HC-113, HC-129, HC-147). Multiple years of data were pooled to obtain adequate sample size for women with SPD. Data were pooled from every other year rather than consecutive years to avoid duplicate respondents from the same panel. The overall response rates for MEPS-HC 2007, 2009, and 2011 were 56.9%, 57.2%, and 54.9% respectively (AHRQ, 2013a) and the conditional response rates for the Self-Administered Questionnaire were generally over 90% (AHRQ, 2013b). Women aged 40 to 74 years with valid responses on the K6 in the 2007, 2009, or 2011 survey ( $n = 17,770$ ) were included in this analysis. Women who reported having hysterectomies ( $n = 5211$ ) were excluded when rates of Pap smear were examined.

### Measures

#### Outcome measures

In the MEPS-HC, women older than 17 were asked how long since their last breast examination and Pap smear test, and women older than 29 were asked how long since their last mammogram. Being up to date with each screening test was defined as receipt of CBE within 2 years, mammography within 2 years (USPSTF, 2009) and Pap smear within 3 years (ACOG, 2009).

#### SPD

The K6 was developed as a brief screening scale for nonspecific psychological distress in adults and has been shown to be strongly predictive of serious mental illness (Kessler et al., 2002, 2003). The K6 asks participants to rate the frequency of six symptoms of psychological distress over the past 30 days on a 5-point Likert scale of 0 (none of the time), 1 (a little of the time), 2 (some of the time), 3 (most of the time), or 4 (all of the time). These symptoms include feeling a) nervous, b) hopeless, c) restless or fidgety, d) so depressed that nothing could cheer you up, e) that everything was an effort, and f) worthless. The total score for K6 ranges from 0 to 24, with a higher score indicating more severe psychological distress. SPD is defined as a score of 13 or higher on the K6. Selected based on the results from receiver operating characteristic analysis, this cutoff point had a sensitivity of 0.36 and a specificity of 0.96 in predicting past-year serious mental illness (Kessler et al., 2003). Although the instrument is not intended to diagnose specific mental disorders, it can identify persons with mental health problems that are severe enough to cause functioning impairment and require treatment (Croft et al., 2009). Detailed information on the psychometric property and validation of K6 can be found in Kessler and colleagues (2002, 2003).

### Covariates

Potential confounding variables included self-report measures of age, race/ethnicity, education level, household income as percent of the federal poverty level, census region of the country, insurance coverage, usual place of care, body mass index, number of chronic conditions, level of physical activity, current smoking status, number of office-based or outpatient visits in past year, attitude toward medical treatment, and survey year. Self-report chronic conditions included hypertension, hyperlipidemia, asthma, diabetes, emphysema, arthritis, and cardiovascular history (e.g., coronary heart disease, angina, heart attack, stroke, and other heart disease). Physically active was defined as a positive response to the question, “Do you spend half an hour or more in moderate or vigorous physical activity at least 3 times a week?” Attitude toward medical treatment was measured by one item, “I can overcome illness without medical help.” Respondents rated their level of agreement with this statement on a 5-point Likert scale ranging from 1 (disagree strongly) to 5 (agree strongly).

### Statistical Analysis

We used  $\chi^2$  tests were conducted to compare sample characteristics by SPD status. Three logistic regression models were estimated to examine the association of SPD and being up to date with cancer screening tests, adjusting for covariates. Additional logistic regression analyses were conducted, restricted to women with SPD only, to identify potential barriers and facilitating factors to cancer screening among this vulnerable population. All analyses were conducted using Stata statistical software (SE version 11.2) with the complex survey design of the MEPS incorporated. Taylor series linearization method was used for variance estimation (Korn & Graubard, 1999).

### Results

Table 1 shows the characteristics of women in the study sample by SPD status. The prevalence of SPD was 6.1% in the study sample. Having SPD was significantly associated with age, non-Hispanic White race/ethnicity, lower education, lower household income, South region, public only insurance, obesity (body mass index  $\geq 30.0$  kg/m<sup>2</sup>), greater number of chronic conditions, physical inactivity, active smoking, greater number of office-based or outpatient visits, and lower skepticism toward medical treatment.

Table 2 shows unadjusted prevalence and adjusted odds ratios for each screening test by SPD status. Women with SPD had significantly lower up-to-date cancer screening rates, including CBE (67.56% vs. 81.93%), mammography (59.94% vs. 75.56%), and Pap smear (72.27% vs. 85.37%). The differences in screening rates by SPD status remained significant in multivariate logistic regression analysis adjusting for sociodemographics, insurance, health behaviors, comorbidity, and service utilization. Compared with women without SPD, women with SPD had 35% decreased odds of being up to date with CBE and 38% decreased odds of being up to date with mammography. SPD was associated with 41% decreased odds of being up to date with Pap smear among women who did not have hysterectomies.

Table 3 shows results from logistic regression on the correlates of up-to-date screening among women with SPD. Three facilitating factors emerged that were strongly and consistently associated with higher odds of screening utilization among women with SPD, including having a usual place of care, being

**Table 1**

Characteristics of Women in the Study Sample by Serious Psychological Distress (SPD) Status

	Women With SPD		Women Without SPD		p Value
	n*	% <sup>†</sup> (SE)	n*	% <sup>†</sup> (SE)	
No. of respondents	1,340	6.11 (.00)	16,430	93.89 (.00)	
Age groups (y)					.036
40–49	484	35.99 (1.58)	6,046	34.35 (.50)	
50–59	488	36.21 (1.60)	5,421	33.38 (.50)	
60–69	277	21.47 (1.39)	3,753	24.35 (.45)	
70–74	91	6.33 (.75)	1,210	7.93 (.27)	
Race/ethnicity					<.001
White, non-Hispanic	648	66.49 (1.57)	8,519	71.76 (.81)	
Black, non-Hispanic	280	12.99 (1.16)	3,244	11.44 (.55)	
Hispanic	332	14.73 (1.14)	3,309	10.40 (.57)	
Other	80	5.79 (.65)	1,358	6.41 (.42)	
Education level					<.001
Less than high school	458	25.59 (1.42)	2,965	10.76 (.34)	
High school or GED	665	54.38 (1.64)	7,916	48.60 (.58)	
College and higher	209	20.03 (1.49)	5,446	40.64 (.64)	
Poverty level (% FPL)					<.001
$\leq 100$	488	30.69 (1.38)	2,330	9.03 (.29)	
101–125	103	6.77 (.69)	842	3.47 (.16)	
126–200	281	19.82 (1.23)	2,451	11.57 (.32)	
201–400	312	25.40 (1.33)	4,992	29.33 (.46)	
$> 400$	156	17.32 (1.40)	5,815	46.59 (.69)	
Census region					<.001
Northeast	194	14.73 (1.35)	2,773	19.47 (.69)	
Midwest	250	20.57 (1.42)	3,278	22.00 (.64)	
South	584	43.13 (1.78)	6,330	36.40 (.82)	
West	312	21.57 (1.48)	4,049	22.13 (.67)	
Have usual place of care	1,156	87.04 (1.03)	13,533	86.49 (.41)	.607
Insurance status					<.001
Any private	441	40.27 (1.69)	10,776	74.71 (.58)	
Public only	647	42.31 (1.53)	3,096	14.60 (.41)	
Uninsured	252	17.42 (1.19)	2,558	10.69 (.34)	
Body mass index (kg/m <sup>2</sup> )					<.001
$< 18.0$	31	2.60 (.52)	204	1.39 (.13)	
18.0–24.9	308	25.04 (1.46)	5,103	35.92 (.58)	
25.0–29.9	339	25.07 (1.40)	4,826	29.67 (.45)	
$\geq 30.0$	633	47.30 (1.51)	5,713	33.02 (.56)	
No. of chronic conditions					<.001
0	188	15.63 (1.38)	5,337	32.13 (.50)	
1	228	17.21 (1.26)	4,182	26.12 (.44)	
2	258	20.34 (1.56)	3,090	19.50 (.38)	
$\geq 3$	666	46.82 (1.66)	3,821	22.26 (.42)	
Physically active	388	29.04 (1.50)	8,128	52.65 (.63)	<.001
Current smoker	490	37.97 (1.60)	2,514	15.31 (.40)	<.001
No. of medical visits					<.001
0	137	9.12 (.85)	3,113	14.94 (.35)	
1	113	8.06 (.90)	1,945	10.78 (.30)	
2–5	324	23.19 (1.36)	5,313	32.34 (.44)	
$> 5$	766	59.63 (1.57)	6,059	41.94 (.51)	
Attitude toward medical treatment	1.62 (mean)		1.94 (mean)		<.001

Abbreviations: FPL, federal poverty level; SPD, serious psychological distress (defined as a score of 13 or higher on the Kessler Psychological Distress Scale-6 items); SE, standard error.

\* Unweighted number.

† Portion of weighted sample.

physically active, and greater medical service utilization in past year. Having a usual place of care was associated with a two- to three-fold increase in the odds of being up to date with screening while holding other covariates constant. Women who were physically active had 80% increased odds of up to date with CBE, 47% increased odds of up to date with mammography, and 147% increased odds of up to date with Pap smear. Women who had more than five medical visits in past year were two to four times as likely to have up-to-date screening

**Table 2**  
Unadjusted Prevalence and Adjusted Odds Ratios of Up-To-date Cancer Screening by SPD Status

Cancer Screening	Total %	Women With SPD (n = 1,340)		Women Without SPD (n = 16,430)	
		%*	OR (95% CI) <sup>†</sup>	%*	OR (95% CI) <sup>†</sup>
Up to date with clinical breast examination <sup>‡</sup>	81.06	67.56	0.65 (0.55–0.78)	81.93	1.00 (reference)
Up to date with mammography <sup>§</sup>	74.61	59.94	0.62 (0.52–0.74)	75.56	1.00 (reference)
Up to date with Pap smear <sup>  </sup>	84.67	72.27	0.59 (0.45–0.77)	85.37	1.00 (reference)

Abbreviations: OR, odds ratio; SPD, serious psychological distress (defined as a score of  $\geq 13$  on the Kessler Psychological Distress Scale-6 items).

\* Portion of weighted sample.

<sup>†</sup> Adjusted for age, race/ethnicity, education level, household income, census region of the country, insurance coverage, usual place of care, body mass index, physical comorbidity, level of physical activity, smoking status, number of office-based or outpatient visits in past year, attitude toward medical treatment, and survey year.

<sup>‡</sup> Up to date with clinical breast examination defined as receipt within 2 years; n = 17,770.

<sup>§</sup> Up to date with mammography defined as receipt within 2 years; n = 17,770.

<sup>||</sup> Up to date with Pap smear defined as receipt within 3 years for women who did not have hysterectomies; n = 12,559.

compared with those without any visit. The odds of being up to date with screening also increased with household income. Women with household income greater than 400% federal poverty level were two to three times as likely to have up-to-date breast cancer screening compared with women living under the federal poverty level.

## Discussion

This is the first study of a nationally representative sample of women aged 40 to 74 years to examine the relationship between past-year mental health problems and cancer screening utilization. The study addresses the limitations of previous research by using SPD as an indicator of mental illness that is more reliable and applies more broadly to a representative population of women. The prevalence of SPD in the study sample was 6.1%, higher than the prevalence in the general adult population (3.1%) and women overall (3.9%) estimated using data from the National Health Interview Survey series (Pratt et al., 2007). This result is not surprising given that SPD is generally higher among women compared with men, and is the highest in middle age (Pratt et al., 2007). The overall rates of up-to-date screening utilization in the study sample are comparable with recent estimates obtained from other national surveys in the United States (CDC, 2012), suggesting that the estimates of cancer screening in the present study are likely to be reliable and nationally representative.

This study found substantial disparities in cancer screening utilization among women by SPD status. Women with SPD were nearly 40% less likely to have up-to-date CBE, mammography, and Pap smear compared with women without SPD. The findings were similar to previous studies using larger and more representative samples where a significant effect of mental illness on cancer screening was found (Carney & Jones, 2006; Druss, Rosenheck, Desai, & Perlin, 2002). Using data from a large sample of patients with chronic conditions and multiple medical visits in the Veterans Health Administration, Druss and

associates (2002) found that patients with psychiatric disorders had a 22% decreased odds of breast cancer screening and 13% decreased odds of cervical cancer screening compared with those without psychiatric disorders. In a large sample of privately insured women aged 40 to 64 years, Carney and Jones (2006) found that women with mood disorders were less likely to have mammography compared with women without mood disorders, and the rates of screening decreased further as the level of mood disorders became more severe.

Women with SPD and other mental health problems may be at risk for underutilization of cancer screening due to complex factors. SPD has been associated with lack of health insurance, socioeconomic disadvantages, unhealthy behaviors (Pratt et al., 2007) and unhealthy weight (Zhao et al., 2009), all of which are known risk factors for underutilization of cancer screening among women (Aggarwal et al., 2013; Ferrante, Chen, Crabtree, & Wartenberg, 2007). Interestingly, women with SPD utilized general medical services at significantly higher rates compared with women without SPD, as evident in the present study and previous studies (Dismuke & Egede, 2011; Thorpe, Kalinowski, Patterson, & Sleath, 2006). Greater utilization of general health services is often positively associated with higher rates of cancer screening among women (Tilbrook et al., 2010). The significantly greater number of medical visits but substantially lower rates of cancer screening among women with SPD indicate that these women may experience unique obstacles in the care process that go beyond access to general health care. The disabling nature of mental illness may lead to self-neglect, underreporting of physical symptoms, and impaired ability to communicate needs and symptoms (Jeste et al., 2003). Some also believe that health providers' negative attitude toward people with mental illness discourages them from seeking help and ultimately leads to poorer quality of care and health outcomes (Thornicroft, Rose, & Kassam, 2007). In the fragmented health care system in the United States, the presence of mental health problems may add additional obstacles to receipt of procedures that require multiple steps and participants to complete, such as mammography (Druss et al., 2002). Future studies need to directly examine the mechanisms from mental illness to lower cancer screening to target intervention efforts.

The substantial and consistent differences in cancer screening utilization by SPD status point out the usefulness of the K6 as a screening tool to identify women at risk for low utilization of cancer screening. SAMHSA recommends the K6 as a screener for mental health problems in primary care and other health care settings. Because of its brief nature and easy scoring system, the K6 can be easily implemented as part of patient clinical assessment. Moreover, the K6 has been implemented in major national surveys and surveillance systems in the United States and multiple countries (Croft et al., 2009), making it possible to monitor the disparities in cancer screening by mental health problems over time and evaluate the effectiveness of population-based interventions and initiatives in reducing the disparities.

The findings that usual place of care and greater number of medical visits were associated with substantially greater odds of cancer screening utilization among women with SPD suggest that having a regular health care provider and their engagement in patient care may help to improve cancer screening utilization among this population. Although fewer than 40% of persons with SPD receive mental health services in a given year (Han, Gfroerer, Colpe, Barker, & Colliver, 2011), they utilize general medical care (e.g., outpatient, inpatient, and emergent care) at much higher



**Table 3**  
Correlates of Up-to-Date Screening Among Women With Serious Psychological Distress

Variable	Clinical Breast Examination <sup>*</sup>	Mammography <sup>†</sup>	Pap Smear <sup>‡</sup>
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age groups (reference: 40–49)			
50–59	0.94 (0.63–1.40)	1.30 (0.90–1.88)	0.70 (0.42–1.17)
60–69	0.95 (0.58–1.57)	1.78 (1.08–2.92)	0.72 (0.35–1.50)
70–74	1.06 (0.52–2.16)	1.24 (0.65–2.39)	0.68 (0.27–1.72)
Race/ethnicity (reference: White)			
Black, non-Hispanic	2.44 (1.67–3.58)	2.02 (1.40–2.93)	5.51 (2.55–11.90)
Hispanic	1.56 (0.99–2.66)	1.81 (1.14–2.89)	2.48 (1.31–4.70)
Other	0.84 (0.44–1.60)	0.80 (0.43–1.50)	1.38 (0.56–3.40)
Education level (reference: <High school)			
High school or GED	0.98 (0.66–1.44)	1.06 (0.74–1.53)	1.04 (0.59–1.83)
College and higher	1.22 (0.74–1.99)	1.09 (0.65–1.82)	1.45 (0.69–3.04)
Poverty level (reference: ≤100% FPL)			
101–125% FPL	1.04 (0.54–2.02)	1.23 (0.71–2.15)	1.04 (0.37–2.96)
126–200% FPL	1.37 (0.88–2.12)	1.39 (0.91–2.12)	2.07 (1.19–3.59)
201–400% FPL	1.33 (0.80–2.22)	1.90 (1.19–2.12)	1.20 (0.62–2.30)
>400% FPL	2.12 (1.04–4.35)	2.91 (1.56–5.40)	1.70 (0.70–4.16)
Census region (reference: Northeast)			
Midwest	0.72 (0.43–1.23)	0.81 (0.45–1.46)	0.82 (0.40–1.72)
South	0.63 (0.39–1.03)	0.72 (0.43–1.21)	0.87 (0.42–1.80)
West	0.62 (0.35–1.11)	0.63 (0.34–1.17)	0.80 (0.40–1.62)
Have usual place of care	2.53 (1.56–4.10)	1.72 (1.04–2.86)	2.99 (1.55–5.77)
Insurance status (reference: Any private)			
Public only	0.69 (0.41–1.14)	1.10 (0.67–1.80)	0.70 (0.34–1.44)
Uninsured	0.50 (0.30–.84)	0.66 (0.39–1.12)	0.97 (0.46–2.03)
Body mass index (reference: 18.0–24.9 kg/m <sup>2</sup> )			
<18.0	0.54 (0.21–1.36)	0.43 (0.16–1.17)	0.52 (0.19–1.41)
25.0–29.9	0.89 (0.54–1.47)	0.89 (0.54–1.46)	1.18 (0.55–2.52)
≥30.0	0.81 (0.53–1.25)	0.89 (0.59–1.33)	0.86 (0.50–1.49)
No. of chronic conditions (reference: 0)			
1	0.64 (0.36–1.16)	1.18 (0.64–2.17)	0.45 (0.20–1.00)
2	0.61 (0.32–1.17)	0.87 (0.48–1.56)	0.42 (0.17–1.01)
≥3	0.74 (0.40–1.34)	1.15 (0.66–2.00)	0.55 (0.26–1.15)
Physically active	1.79 (0.125–2.55)	1.47 (1.03–2.10)	2.47 (1.46–4.17)
Current smoker	0.88 (0.64–1.20)	0.88 (0.62–1.27)	0.88 (0.54–1.44)
No. of medical visits (reference: 0)			
1	1.32 (0.57–3.07)	0.80 (0.34–1.89)	1.76 (0.68–4.52)
2–5	2.18 (1.13–4.20)	1.58 (0.88–2.85)	4.27 (1.75–10.40)
>5	2.36 (1.22–4.58)	2.54 (1.36–4.73)	4.65 (2.10–10.27)
Attitude toward medical treatment	0.94 (0.78–1.14)	1.01 (0.84–1.22)	1.05 (0.84–1.31)

Abbreviation: OR, odds ratio.

Note. Serious psychological distress defined as a score of ≥13 on the Kessler Psychological Distress Scale-6 items.

\* Up to date with clinical breast examination defined as receipt within 2 years;  $n = 1,340$ .

† Up to date with mammography defined as receipt within 2 years;  $n = 1,340$ .

‡ Up to date with Pap smear defined as receipt within 3 years for women who did not have hysterectomies;  $n = 874$ .

rates than persons without SPD (Dismuke & Egede, 2011). More than 90% of the women with SPD in the study sample had at least one medical visit to an office-based or outpatient provider in the past year. Their frequent contact with the health care system opens up opportunities for health care providers to implement targeted interventions and patient education to improve the utilization of evidence-based preventive services among women with mental health problems.

The results of this study should be interpreted in the context with several limitations, including those inherent to the cross-sectional study design and self-report measures. The clinical diagnosis of mental illness that SPD corresponds with is unclear (Pratt et al., 2007), although K6 items seem to primarily assess symptoms of depression and anxiety. Moreover, current guidelines from the nation's major institutions and health authorities are inconsistent regarding the benefits of routine CBE in women 40 years or older. Although the American Cancer Society (2014) and National Comprehensive Cancer Network (2014) recommend annual CBE in women 40 years or older, the USPSTF (2009) "concludes that the current evidence is insufficient to assess the

additional benefits and harms of CBE beyond screening mammography in women 40 years or older. Grade: I Statement" (p. 717). Therefore, the utility of CBE as a cancer screening methodology may be contested. However, difference in the utilization of CBE as an indicator of disparities in care is still of value. The finding that women with SPD were less likely to get CBE than women without SPD enforces the concern that there may be mental illness related disparities in the care of women. In addition, the USPSTF changed its recommended age for mammography screening from 40 to 50 in 2009. This study used an older guideline when comparing mammography screening among women aged 40 to 74, and covered periods before and after the guideline change. Nevertheless, a recent study using nationally representative data did not find any impact of the guideline change on mammography screening rates among women aged 40 to 49 (Pace, He, & Keating, 2013). This result suggests that the guideline change is unlikely to affect the findings of the current study. National guidelines regarding cervical cancer screening changed after the study was completed. The most recent guidelines published in 2012 recommend against routine yearly

cervical cancer screening and screening in women aged 65 years or older with adequate screening history (ACOG, 2012; Moyer & USPSTF, 2012). Although these changes are unlikely to affect the findings of the current study, future research needs to examine the impact of the changes in clinical guidelines on mental illness-related disparities in cancer screening among women.

By using a global indicator of mental health problems to address the limitations of previous research, this study was able to study the relationship of mental illness and cancer screening in a nationally representative sample of women, and thus greatly enhanced its generalizability. Moreover, this study included most confounders known to covary with both mental illness and cancer screening utilization, an improvement from previous studies where some known confounders were generally omitted in the analyses (Carney & Jones, 2006; Lasser et al., 2003; Martens et al., 2009).

### Implications for Practice and/or Policy

Women with mental health problems have substantial risk for low uptake of routine breast and cervical cancer screenings. The K6 may be a useful tool to screen for this risk factor. The frequent contact with the health care system among women with mental health problems opens up opportunities to reduce the mental illness related disparities in utilization of cancer screening. Data on the K6 and cancer screening utilization collected through national health surveys such as the National Health Interview Survey and the MEPS can be used to monitor the progress of the disparities in cancer screening among women with mental health problems.

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